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EXAMINER	
CALEY, MICHAEL H	
ART UNIT	**PAPER NUMBER**
2871	

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/936,999	NAKAMURA ET AL.	
	Examiner	Art Unit	
	Michael H. Caley	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4-6 and 10-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4-6 and 10-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 4-6 and 10-20 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for providing desired ranges for the maximum and minimum transmission and reflection properties of the reflecting layer and the diffusing layer, does not reasonably provide enablement for the construction of such an apparatus to achieve these transmission and reflection results. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The specification does not provide support for the limitations "a difference between the maximum and the minimum of a transmittance of the light diffusing layer is not larger than 20% in a visible light region" and "a difference between the maximum and the minimum of a reflectance of the reflecting layer is not larger than 20% in a visible light region" and "wherein both of the transmission spectral characteristics of a visible light region of the light diffusing layer and the reflection spectral characteristics of a visible light region of the metal reflecting layer are of a flat type".

The examiner notes that Applicant defines "of the flat type" to mean that "the transmittance or the reflectance is set within +/- 10% in the visible light region" as amended to the specification on 10/14/03.

One of ordinary skill in the art would be subjected to undue burden in attempting to construct the metal reflecting layer having the claimed "flat" reflection characteristic according to the guidance provided by the specification. (In re Wands, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988)). Applicant's sole guidance is presented in an extensive list of possible construction materials (spanning pages 11 and 12 of the specification) common in the art for building such reflectors and a remark that the reflector would preferably have a specular reflection property. Applicant presents a desired result of the reflection spectral characteristic (Figure 6 element 34), however provides no details or working examples as to which types of materials in combination with what types of specular reflection properties may achieve this result beyond what is readily available in the prior art. Based on the information from the disclosure, an excessive amount of experimentation would be needed to achieve the desired reflectance characteristic given the large number of possible materials to use and due to the variety of possible types of specular reflection methods in the prior art. Due to the open-ended type of description of the possible combinations of materials to use and the types of specular reflection methods of the prior art, no amount of experimentation would necessarily guarantee the desired results. Such a list in combination with the desired results does not provide an enabling disclosure for the reflective layer with the claimed reflectance characteristic.

Moreover, one of ordinary skill in the art would be subjected to undue burden in attempting to construct the light diffusing layer having the claimed "flat" transmission characteristic according to the guidance provided by the specification. Applicant's sole guidance is presented in an extensive list of possible construction materials (spanning pages 13 and 14 of

the specification) for the adhesive agent and the diffusion material with no examples of preferable combinations of materials, dispersion densities of the particles, diameter of the particles, etc. beyond the prior art. Applicant presents spectral results of an inferior light diffusing layer of the prior art (Figure 6 element 35b) compared to the spectral characteristics of the diffusing layer of the present invention (Figure 6 element 35a). In page 20 of the specification, Applicant states "by adjusting the material of the adhesive agent 17 and the diffusion material 16, the dispersion density of the diffusion material 16 and the particle diameter d of the diffusion material 16, it becomes possible to make the transmission spectral characteristics of the light diffusion adhesive 11a match the reflection spectral characteristics of the reflecting layer". In endeavoring to construct the diffusion layer having the proposed spectral characteristic, one skilled in the art would be required to conduct an experiment involving four independent variables (adhesive material, diffusion material, dispersion density, and particle diameter), presenting an endless number of possible combinations. Furthermore, the materials and parameters listed are common in the art for building such diffusers and Applicant provides no specific guidance as to achieving a superior diffuser to that of the prior art. Such a list in combination with the desired results does not provide an enabling disclosure for the diffusion layer with the claimed transmittance characteristic.

It is further noted that the notion of uniform transmittance and reflectance across the visible wavelength range for reflecting and diffusing layers is a concept and design goal well known in the art. For example, Miyamoto et al. (U.S. Patent No. 6,147,733) teaches that such attributes of these layers generally results in a higher display quality (Column 1 line 66 to

Column 2 line 8, Column 3 lines 18-30, lines 38-41, Column 22 lines 1-18). Although Miyamoto's description of the transmittance and reflectance characteristics apply to a single layer, such a concept may be analogously applied to separate layers as a means of achieving satisfactory color tone and lightness.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4, 10, 11, 14, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwata et al. (U.S. Patent No. 6,111,699 "Iwata") in view of Miyamoto et al. (U.S. Patent No. 6,147,733 "Miyamoto").

Regarding claim 4, Iwata discloses a liquid crystal display having:

a liquid display panel which sandwiches a liquid crystal layer between a first substrate and a second substrate (Figure 15 elements 104);

a reflecting layer which is mounted on the first substrate and reflects light (Figure 15 element 112); and

a light diffusing layer which is mounted on the second substrate (Figure 15 element 102).

Iwata fails to explicitly disclose the reflecting layer as made of metal and the transmission spectral characteristics of a visible light region of the light diffusing layer and the reflection spectral characteristics of a visible light region of the reflecting layer as of a flat type. The examiner takes Official notice that metal is a commonly used reflection material for a reflector in a liquid crystal display device. Miyamoto details such a condition as desirable in a liquid crystal display in order to achieve a satisfactory color tone and lightness (Column 1 line 66 to Column 2 line 8, Column 3 lines 18-30). Miyamoto teaches diffusers and reflectors that achieve the proposed spectral characteristics (Figures 8-11 and 13-22). The proposed diffused transmittance of +/- 10% is presented in Figure 8 element b. The proposed reflectance is disclosed in Figure 14 element d.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the reflecting layer from a metal material and to have made the transmission spectral characteristics of a visible light region of the light diffusing layer and the reflection spectral characteristics of a visible light region of the reflecting layer as of a flat type. As taught by Miyamoto, a diffuser that transmits light uniformly over the visible spectral range or a reflector that reflects light uniformly over the visible spectral range is desirable in liquid crystal displays to produce consistent color tones and brightness (Column 1 line 66 to Column 2 line 8, Column 3 lines 18-30). One would have been motivated to ensure such independent characteristics of the diffuser and the reflector in order to reproduce colors accurately through the display and provide a pleasing image. Furthermore, one would have been motivated to use a metal layer as a means of achieving a high reflectance as is commonly known in the art.

Regarding claims 10, 11, 14, and 19, Iwata discloses all of the proposed limitations except for a difference between the maximum and the minimum of a transmittance of the light diffusing layer as not larger than 20% in a visible light region and a difference between the maximum and the minimum of a reflectance of the reflecting layer as not larger than 20% in a visible light region. Miyamoto, however, details such a condition as desirable in a liquid crystal display in order to achieve a satisfactory color tone and lightness (Column 1 line 66 to Column 2 line 8, Column 3 lines 18-30). Miyamoto teaches diffusers and reflectors that achieve the proposed spectral characteristics (Figures 8-11 and 13-22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the diffuser and reflector such that they have a uniform transmittance and reflectance respectively across the visible spectral range. As taught by Miyamoto, a diffuser that transmits light uniformly over the visible spectral range in combination with a reflector that reflects light uniformly over the visible spectral range is desirable in liquid crystal displays to produce consistent color tones and brightness (Column 1 line 66 to Column 2 line 8, Column 3 lines 18-30). One would have been motivated to ensure such a matching between the diffuser and the reflector in order to reproduce colors accurately through the display and provide a pleasing image.

The Examiner notes that such a uniform spectral characteristic in the reflector and the diffuser is a design objective generally common to liquid crystal displays of similar construction as a means of achieving proper coloring and brightness. As noted above, the specification and claim fail to distinguish a novel feature of the diffuser and reflector which would enable one of ordinary skill to construct a diffuser and reflector with such a uniform spectral characteristic

beyond that of the prior art. Therefore, the subject matter of claims 4, 10, and 14 does not appear to be novel.

Regarding claim 17, Iwata discloses the light diffusing material as organic material particles (Column 8 lines 46-67).

Regarding claim 18, Iwata discloses the light diffusing material as inorganic material particles (Column 8 lines 46-67).

Regarding claim 20, Iwata discloses a diameter of the light diffusing material as in a range of 3 um to 10 um (Column 8 lines 46-67).

Claims 5, 6, 12, 13, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwata in view of Miyamoto and in further view of Woodgate et al. (U.S. Patent No. 6,483,613 "Woodgate").

Regarding claims 5, 12, and 15, Iwata and Miyamoto fail to disclose an auxiliary light source for illuminating an upper surface of a liquid crystal display panel and an input device for inputting data as arranged over the light diffusing layer. Woodgate, however, teaches such a configuration of elements as advantageous in a portable liquid crystal device such as a personal digital assistant (PDA) (Abstract, Column 1 lines 15-40; Figures 10A-10H).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the reflective liquid crystal display device disclosed by Iwata as a PDA

having an auxiliary light source and an input device arranged over the diffusing layer. One would have been motivated to provide an input device given the reflective display's advantageous use as a PDA as a energy conserving device (Column 1 lines 25-28). Furthermore, one would have been motivated to include an auxiliary light source as a means of improving the performance of the display in poorly lit conditions (Column 1 lines 33-34).

Regarding claims 6, 13, and 16, Iwata and Miayamoto fail to disclose color filter films as provided to an inner surface of either one of the first substrate or the second substrate. Woodgate, however, teaches such a color filter in a similarly constructive reflective liquid crystal display (Figure 9A element 64).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed a color filtering device as proposed. One would have been motivated to include a color filtering device as a means of realizing a reflective color liquid crystal display. Such an improvement would have been advantageous to display color images, improving the versatility of the device. One would have been motivated to provide color in such a way to the device disclosed by Iwata in order to improve its marketability by providing a more visually pleasing display.

Response to Arguments

Applicant's arguments filed 6/7/04 have been fully considered but they are not persuasive. As stated above, the examiner respectfully disagrees with Applicant on the matter of

an enabling disclosure for the reflecting layer and the diffusing layer having the respective reflectance and transmission spectral characteristics.

The mischaracterization by the examiner of the Miyamoto et al. reference as discussed in Page 11 of Applicant's Remarks is noted. Although Miyamoto's description of the transmittance and reflectance characteristics apply to a single layer, such a concept may be analogously applied to separate layers as a means of achieving satisfactory color tone and lightness.

Additionally, it is noted that Miyamoto's definition of "almost flat" in reference to the noted curves of Figures 13 and 14 fits within Applicant's definition of "flat type" being within +/- 10% in the visible light region (Figure 13 element b ranging from 36% to 52%, Figure 14 element d ranging from 40% to 43%).

Furthermore, it is noted that the Miyamoto reference supplies a teaching that it is beneficial for a reflecting layer and/or a diffusing layer to have a uniform transmission or reflectance characteristic across the visible wavelength range. Although Miyamoto discloses such a layer as having a dual use and constructed of a different material, such a teaching still provides clear motivation to construct such analogous layers with identical functions as disclosed by Iwata to have the same uniform spectral characteristics as a means of producing a more visually pleasing display.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael H. Caley whose telephone number is (571) 272-2286. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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